Willow North Watershed Monitoring and Standards and Guidelines Report

Glasgow Field Station
2005

Introduction

The Willow North Watershed includes 150,827 acres of BLM – administered public lands as well as 57,000 acres of private and state lands in north Valley County, Montana. Land ownership is approximately 72% public administered by the BLM. The watershed is comprised of 16 livestock grazing allotments with 10 permittees holding the 10-year term permits. There are currently seven implemented Allotment Management Plans (AMP) in this watershed.

The watershed level management program being used in the Glasgow Field Station is a result of decisions made in the Judith-Valley-Phillips Resource Management Plan (JVP-RMP) dated September 1994. Initial assessments of the riparian and upland areas of the Willow North Watershed were conducted during the grazing seasons of 1997 and 1998. The Willow North Watershed Plan was completed in March of 1999.

This report updates the upland condition assessment and the progress made in those allotments that were not meeting the rangeland standards.

History

The Willow North Watershed Plan determined that the uplands were meeting the upland standard and in "proper functioning condition". The upland standard is not the same as the objectives given in the JVP RMP, (ie: 80% good or excellent ecological condition). The standards provide a baseline that every allotment is measured against, but the objectives in the RMP are different and may be higher. The watershed was originally mapped for ecological status in 1978 & 1979 and only 57 % was in good or excellent ecological condition. A major portion of the watershed was mapped again in 2004 to determine changes in ecological condition.

The mapping in 2004 showed a small increase in the percent Potential Natural Community (PNC) & Late serial stages from 57% to 59%. The mapping method changed slightly as the crested wheatgrass seeding was removed from the condition classifications and put in a separate category and the bare shale category was adjusted more appropriately to reflect actual conditions.

The riparian condition and recommendations as described in the Willow North Watershed Plan are shown in table 2. The riparian studies in the watershed were all completed in 2004. The livestock grazing recommendations for allotments #4711and #4717 were fully implemented, while the recommendations for allotment #4053, #4718 and allotment 4726 were partially implemented during the initial 5-year implementation period. Chemical and biological weed control has continued at the same level to control leafy spurge.

Climatic data gathered at the Opheim 12SSE weather station showed above average growing season precipitation (.7 inches) and slightly above average temperatures (.1 degrees) for the evaluation period of 1999 to 2004. The 15-year averages were close to the long term average for both precipitation (+.1 inches) and temperature (+.6 degrees).

The Glasgow Field Stations monitoring policy states that areas not meeting rangeland standards would be monitored every year. Sites that were meeting standards would be monitored every three years. All sites can be monitored more frequently if desired or needed by the BLM or the permittees.

Upland Status

The original and updated seral stages\ ecological condition for the allotments is listed in Table 1.

Table 1

Allot	PNC		Late		Mid		Early		Bare Shale		Non-native
	1979	2004	1979	2004	1979	2004	1979	2004	1979	2004	2004
4024	74	74	1312	1596	4473	4590			786		385
4041	1078	1524	5985	7264	8869	8255			1200		67
4042	0	0	473	473	14	14			3		
4043	0	0	39	39	8	8			2		
4053	0	0	1523	5953	12528	9483			1554		
4054	3858	3737	23637	19137	1880	4686			3939		149
4056	0	0	1852	1482	371	459	147		5		434
4057	90		70	-	-	-	-		-		-
4058	8	8	738	259	51	73	228	97			685
4071	0	0	6691	9348	2417	821			1158		
4711	0	0	4784	3001	5842	5121			387		1478
4717	0	0	1856	1782	1684	2048			313		23
4718	98	98	11202	15383	13825	11747	132		1994		
4718	98	98	11202	15383	13825	11747	132		1994		
4722	0	0	1440	2970	1591	2396	42		518		
4725	15	1	290	299	27	37					
4726	80	0	10449	10748	6451	6370	77	920	1001		
Total		5442		79734		56108		1017			3221

Trend Photo:

The Willow North Watershed Report used a limited set of upland monitoring studies to determine whether the watershed was meeting the upland standards. It was decided in 2004 to do a thorough inventory of existing upland trend studies and reread the studies that had shown some vegetative change or potential to change. Most of the upland studies had not been read and photographed since the early 1990's.

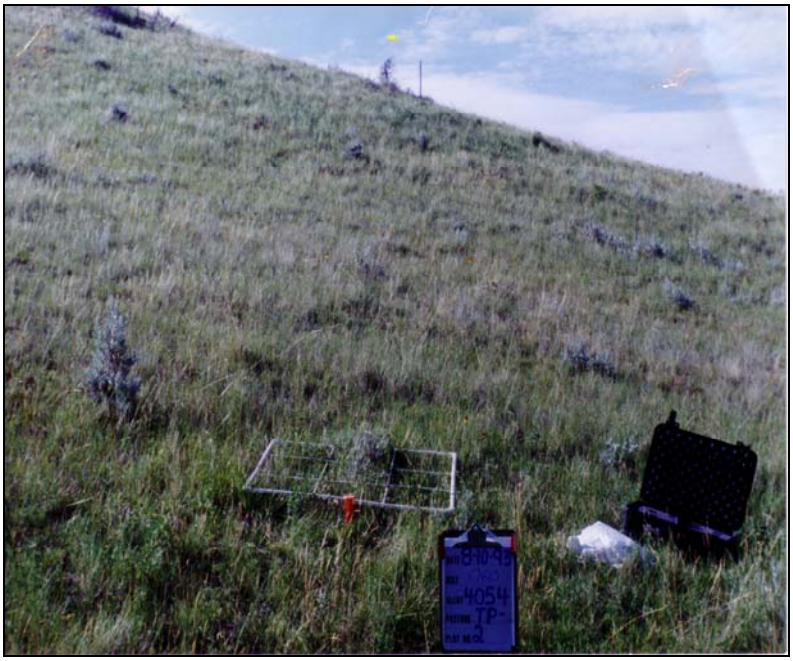
Collectively the data and pictures indicated a general upward or static trend from the early 1990's to 2004. Climatic conditions seemed to have the most impact on species composition with grass plants increasing and woody species declining slightly. The woody species increased in the drought years in the 1980's, but have declined as rainfall amounts have increased. The clubmoss dominated sites have remained essentially static with plant vigor increasing or decreasing depending on favorable or unfavorable climatic conditions.

Land health data at trend site:

A land health assessment sheet was completed at each trend site that was photographed and read. The assessment consisted of an ecological status survey of the entire ecological site.. This assessment also included several erosion check lists and general trend indicators. These assessments showed land health conditions to be adequate on all sites, except for where leafy spurge infestations were dominating the site.

This set of three trend photos shows the typical shallow clay –clay ecological site in the watershed. The photos show a diversity of vegetative species (shrub, grass & forb). Notice the loss of buffalo berry bushes at the top of the hill. The die off is due to drought in the 1980s. The decline in buffalo berry is evident through out the watershed.

Allotment #4054 1982 TP2



Allotment #4054 1993 TP2

Allotment #4054 2004 TP2

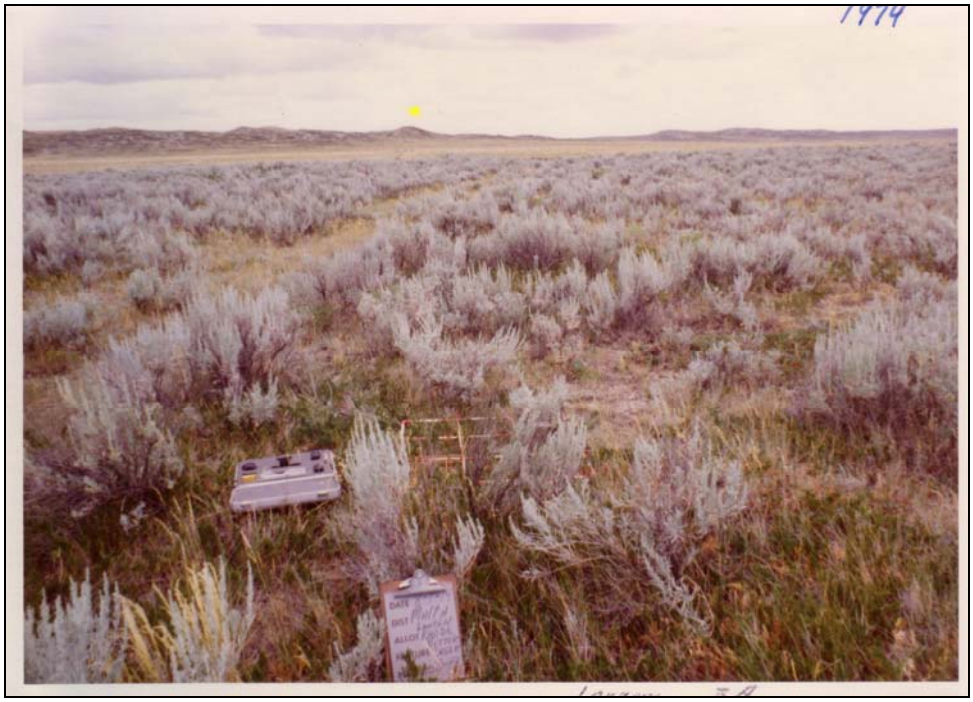
The following 3x3 trend photos in the Upper Willow Allotment #4718 show the typical silty upland site in the watershed. Notice the increase in grass cover since the 1970s.

Allotment 4718 1969 Plot b1

Allotment 4718 1981 Plot b1

Allotment 4718 2004 Plot b1

These two photographs show a sagebrush site on the Eastfork Willow Creek that has changed very little since 1974. Notice the new Peach leaf willow trees in the background



Allotment 4053 1974 3A

Allotment 4053 2004 3A

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Weeds:

History

Leafy spurge infestations continue to be a large problem on public land in the Willow North Watershed. Leafy spurge is a deep-rooted, long lived perennial that is extremely difficult to control. Leafy spurge infestations occur in the Burnett Creek, Willow Creek, Deep Creek, Chisholm Creek, Bitter Creek, Spring Coulee, Ash Coulee and Eagles Nest Coulee drainages.

Since 1984, BLM has been involved in cooperative control efforts with the Valley County Weed District and the Cooperative State Grazing Districts. With this agreement, the county provides the expertise, equipment and labor to control noxious weeds on public lands located in Valley County and the BLM reimburses the county for the expenses incurred. The four Cooperative State Grazing Districts in Valley County have been cooperating parties throughout the history of the project. Control on private and state lands has been funded by the Grazing Districts and grants. Our objectives for the Rock Creek Weed Management Area, which includes the Willow North Watershed, has been to prevent the establishment of leafy spurge on non-infested lands, gradually reduce the population via chemical control and to use biological control and grazing management were chemical application is unpractical due to high resource values.

Chemical

The success of this portion of the weed control project depends upon funding. Funding was very limited for the first 15 years of the project and control was largely ineffective. However, since 1999, funding has been adequate allowing 30- 35 hours of annual aerial application on the weed perimeter. Aerial application has allowed us to contain the rapid outward spread of spurge and to inventory for any new infestations and take immediate action to control the new infestation. In 2002, we were able to redraw our aerial weed perimeter inward due to the excellent control on the perimeter. In 2002, we treated 160 aerial acres; however, in 2004 we treated only 65 aerial acres in the Willow North Watershed. This implies that we are controlling this weed and decreasing the size of weed infestation. (see map1).

Biological Control

We have concentrated our biological control efforts in the Willow North Watershed. Flea beetles establish a natural balance with leafy spurge, reducing it to a non-impact plant and tolerable member of the plant community. Establishing the flea beetle in adequate numbers is the absolute key to success. Although biological control generally takes time to produce results, significant reductions in leafy spurge densities have been achieved in as little as 2-3 years when flea beetles quickly establish large populations (refer to photographs, on next page). Twelve new biological control releases sites were established in 2004 Willow Creek, Burnett Creek, Bitter Creek, Ash Coulee, Spring Coulee and Eagles Nest Coulee drainages. Flea beetles are well established throughout the watershed as a result of large numbers of releases made each year beginning in 1987.

Grazing Management

Grazing management can help control leafy spurge by increasing the competitiveness of desirable plants by carefully timed livestock grazing and by removing the weed. Sheep grazing requires a minimum of two grazing periods in a season (i.e. spring and fall). We have seen positive results with one permittee in this watershed who has used sheep along with flea beetles to significantly reduce the spurge population along

Willow Creek. Sheep grazing is a practical and feasible alternative and we would like to encourage the permittees in this watershed to consider this type of bio-control.

These photographs were taken inside of the spray boundary showing the impact of using beetles as a biological control. These pictures show the success we are seeing with biological control management.

1996

2004

1996

2004

The pictures above were taken below Hose Reservoir. The original pictures were taken in 1996, after the initial release of the A. Lacertosa flea beetles. The photographs show that the flea beetles are controlling the leafy spurge, allowing the native grass species to compete, thus returning the site to a native plant community.

Riparian

The following table describes the original condition of the riparian zones that did not meet the riparian standards as described in the Willow North Watershed Report. The scores determining Proper Functioning Condition (PFC) were generated using the Montana Riparian\Wetland Association method.

Table 2. Riparian Objectives, Riparian Standard Status, Recommended Actions

1. Allotment	2. Stream and Site	3. Site Specific Objectives (CT = Community type HT = Habitat type, Hanson et. al. 1995)	4 Miles	5. Function-health / trend	6. Spruge **	7. Does not meet stand-ard due live-stock	8. Recommended actions
4053	Eastfork Willow Creek R411	Increase cover of Streambank willow from 0 to 10%; maintain healthy Snowberry CT	8.5	FR / S		yes	change season of use and / or to yearlings, Rest or Deferred rotation
4053	Shaw Coulee R325	Maintain healthy Western wheatgrass HT	3.5	FR / U		yes	change season of use and / or to yearlings Rest or Deferred rotation
4711	Deep Creek R391	Maintain healthy Rose CT, establish willows, increase from 0 to 10% cover in 15 years.	4.2	FR / U		yes	One Crossfence, consider rock dams
4717	Deep Creek R392	Maintain healthy Rose CT, establish willows, increase from trace to 20 % cover in 15 years.	3.6	NF / S		yes	Riparian pasture, consider rock dams
4718	Willow Creek	Maintain healthy Rose CT, increase	9.7	PFC (barel		yes	Monitor closely, if trend

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	R406	willow cover from current trace to 20 % in 15 years.		y)			is not upwards consider temporary electric fence along north side of creek, in WSA or permanent crossfence along WSA boundary road.
4726	Eagle's Nest Coulee R396, 397	R396 Reduce cover of leafy spurge. R397 Maintain healthy Sharp bulrush HT and Reduce cover of leafy spurge.	7	FR / S	X	partly	biological weed control, consider sheep grazing,
4726	Bitter Creek R394	Maintain healthy Beaked Sedge HT Reduce cover of leafy spurge.	8.3	FR /S	X	yes	Consider all available options for management of riparian within the WSA involving the permittees and wilderness groups. Continue biological weed control, consider sheep grazing,

Riparian Current Status

Riparian condition is determined by using the Montana BLM/MRA health and function evaluation form. The form is divided into three main categories vegetation, geology and soils, and hydrology and the streambank. Using the form, a numerical rating is calculated and this number is used to determine overall health of the riparian area; proper functioning condition (>=80%); functioning at risk (>=60-<80%); and non-functioning (<60%). The evaluation uses vegetative characteristics as an integrator of factors operating on the landscape. In addition, an analysis of a sites health and its susceptibility to degradation must consider physical factors (soils and hydrology) for both ecological and management reasons. Because many of the factors that influence the condition of the streams and riparian area are due to natural causes (such as sediment deposition from a high water event) and not due to management or livestock grazing, the ratings in the evaluation form have been weighted to take such situations into consideration.

Table 3 shows the updated riparian scores, by year, for the streams that were not meeting standards:

Table 3

Stream	Allot-ment #	Study #	Score/year	Score/year	Score/year	Score/year	Score/year	Score/year
Eastfork Willow	4053	R-411	78/1997	91/2000	81/2004			
Shaw Coulee	4053	R-325	77/1995	90/2001	87/2003	77/2004		
Deep Creek	4717	R-392	59/1997	84/2000	72/2001	76/2002	77/2003	85/2004
Deep Creek	4711	R-391	74/1997	79/2000	77/2001	64/2002	79/2003	83/2004
Willow Creek	4718	R-505	80/1999	89/2000	82/2001	66/2003	84/2004	
Eagle nest Creek	4726	R-396	80/1997	82/2001	80/2003			
Bitter Creek	4726	R-394	73/1997	96/1999	96/2001	93/2003	93/2004	

The following pages contain initial photos of the above listed sites. Next to the original photos are recent photos of each site as they began meeting standards.

Allotment 4053 R-411 1997

Allotment 4053 R-411 2003

Improvement of this riparian area is attributed to higher than usual precipitation resulting in more bank vegetation.

4711 R-391 1998

4711 R-391 2004

Larger amounts of precipitation have been a factor in the improvement of this riparian area, but the greatest influence has been a change in livestock management due to the implementation of a grazing system. Bank vegetation has increased and livestock trampling has decreased.

Allotment 4717 R-392 Deep Creek 1998

Allotment 4717 R-392 Deep Creek 2004

Improvement of this area is attributed to changes in livestock management as a riparian pasture grazing system was implemented resulting in less grazing use on Deep Creek. The cover of stream bank vegetation has increased and hoof action by livestock on the bank has decreased.

Allotment 4726 R-394 1997

Allotment 4726 R-394 2004

Bio-control has decreased the amount of leafy spurge, a noxious weed, which was the biggest factor in the functioning-at-risk condition of the area.

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Allotment 4718 R-505 1999 Allotment 4718 R-505 2004

Leafy spurge was again the reason for the functioning-at-risk rating. It has since been treated and the riparian area is now in proper functioning condition.

Wildlife

Key Questions from the Willow North Watershed Report

1). Grassland bird management; How do we find a balance to meet habitat requirements for species (especially those listed as sensitive) that need a variety of habitats from very short vegetation to dense, tall cover?

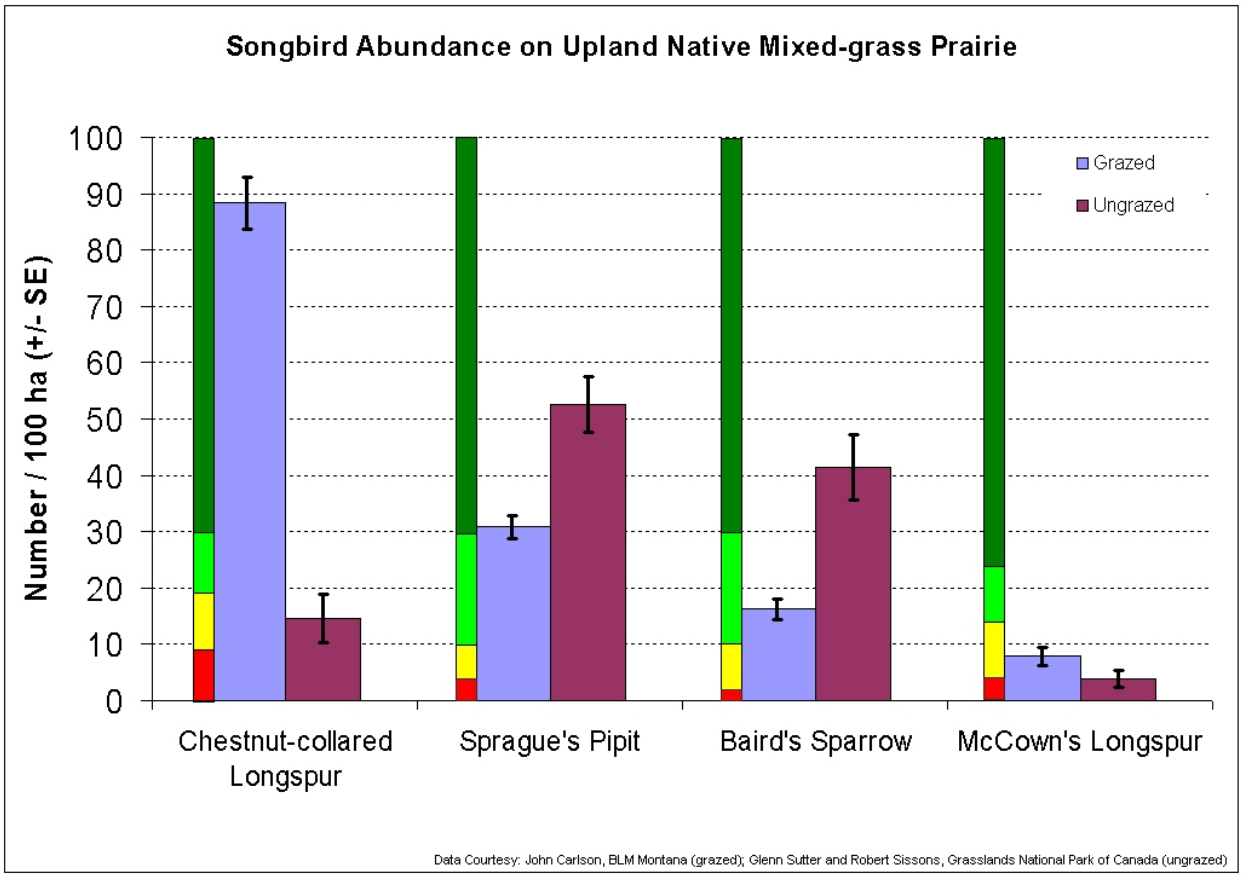


Figure 3. Relative abundance of four grassland bird species of concern in North Valley County MT (grazed) and Grasslands National Park, Saskatchewan, Canada (ungrazed). Colored bars to the left of each species are measures of viability across the landscape: dark green – excellent, light green – good, yellow – at risk, red – non-functional. Current grazing management appears to provide habitat for both mid and tall grass species but may not provide enough short grass habitat for McCown's longspurs and other short grass associated species. *Figure provided by Rob Sissons, Grasslands National Park. Canada.*

The Montana Natural Heritage Program was contracted through the Challenge Cost Share program to conduct bird surveys on grasslands throughout north Valley County. A number of the study sites are located in the Willow North Watershed. Initial results from the surveys suggest that the status of grassland birds within the watershed is currently quite good (See Figure 3.). This watershed has many allotments, the larger ones have had grazing management plans developed for them, while the smaller ones are in custodial management with much variably in the grazing intensity. A variety of habitat conditions result from differing grazing intensity and timing and this is reflected in the diversity and numbers of grassland bird species found throughout the watershed as well as the surrounding landscape. The only concern may be the status of those species that require shorter stature grassland habitats. We are continuing to monitor these populations. In 2005, we were selected as a recipient of a rapid response

assistance program from USGS for the analysis of the data from the grassland bird surveys. We hope this will help clarify the various factors influencing the distribution and status of these species.

2). Swift Fox habitat; What is good swift fox habitat and how can we manage for it?

Since the original Willow North Watershed Report was finished in 1999, swift fox have been observed in the watershed. Joint Canadian and U.S. mid-winter surveys were conducted in 2001 and are planned again for the winter of 2005. Other work by Canadian researchers modeling swift fox habitat needs suggest that the Willow North watershed contains large tracts of potential swift fox habitat. Swift fox populations are apparently continuing to increase and expand throughout northeastern Montana. There is currently no information that suggests coyotes are a problem for continued swift fox expansion.

3). Waterfowl Production; How can waterfowl habitat be developed in cooperation with downstream water users? What management techniques and land treatments should be employed to enhance or maintain current habitat?

We continue to maintain the current waterfowl production reservoirs and monitor the use of these areas annually. The use of these reservoirs appears to be quite high and grassland conditions probably are adequate to provide excellent nesting cover for most waterfowl species. Emergent vegetation may be limited for those species needing this type of habitat but it is unknown if these reservoirs are capable of producing this habitat type.

4). Prairie dog management; What do we need to do to carry out the RMP decision concerning prairie dogs?

The only black-tailed prairie dog town in the watershed is approximately the same size as it was in 1999. There are no current plans to actively control this town. Ongoing prairie dog management planning for Fish, Wildlife & Parks Region 6 may influence BLM's future management options. This prairie dog town also provides habitat for a number of burrowing owls and McCown's longspurs as well as a previously unknown greater sage-grouse lek, all of which are BLM, Montana, and national species of concern.

5) How should crucial winter ranges for mule deer and antelope be managed?

Mule deer and antelope winter range continues to be adequate within this watershed. However, a recently completed study of mule deer in north Valley County documents that mule deer seasonal use may influence future management scenarios within the watershed.

6) Recent updates and concern; greater sage-grouse

Since this watershed plan was published in March 1999, greater sage-grouse have become a priority species for both Montana and the BLM. As a result of this emphasis, we have initiated studies of the breeding and winter habitat throughout the county and have increased efforts to monitor known leks and search for previously undiscovered leks. This work is ongoing and to date we have discovered two new leks in the watershed with 23 male greater sage-grouse on one and 8 on the other during the spring of 2005. There are currently three known greater sage-grouse leks in the watershed. We will also initiate a graduate study on greater sage-grouse in north Valley County in the spring of 2006 in cooperation National Parks Canada and the University of Montana

A Greater Sage-Grouse displays on a lek on the Willow North prairie dog town. This lek was discovered in the spring of 2005.

A McCowns Longspur, a species of BLM concern vocalizes from a rock on the prairie dog town .

Recreation

1. BLM continues to provide for dispersed recreational activities in the watershed. Five cattleguards were installed on the Pipeline road to improve livestock management and improve vehicle access by eliminating the need to open and close gates.

2. Hose Reservoir continues to provide fishing opportunities for the public. Gay Reservoir has not been restocked with fish in an effort to prevent a conflict with Wilderness Study Area Management.

3. Standards and guideline implementation is ongoing which will continue to maintain the Willow North watershed area as a natural grassland.

4. Opportunities to pursue a land exchange with the State of Montana to acquire state lands with mineral estates attached within the Bitter Creek WSA have yet to be realized. Presently a land exchange to acquire private lands within and adjacent to the Bitter Creek WSA has been initiated by a private land owner in exchange for BLM lands identified for disposal in the current JVP Resource Management Plan.

5. The Watchable Wildlife route has been identified as one of the 10 sites of the North East Montana Birding Trail Brochure. As a result, signing of the Watchable Wildlife route within the WSA will be improved in the near future to accommodate increased use of the area by birding enthusiatis. Cattleguards may be placed on the Watchable Wildlife route to eliminate the need to open a gate.

6. Information and boundary signing for the Bitter Creek WSA will be initiated in 2005.

7. Off Highway Vehicle (OHV) travel on BLM public lands is regulated by the June 2003 Record of Decision (ROD) Off Highway Vehicle Environmental Impact Statement and Proposed Plan Amendment for Montana, North Dakota and South Dakota. This Record of Decision designated BLM lands as a limited area for OHV use. Limited area means an area restricted at certain times, in certain areas, and/or to certain vehicular use. Furthermore, the approved preferred alternative in the ROD states that BLM will restrict motorized wheeled cross-country travel yearlong, which effectively limits motorized wheeled travel to existing roads and trails until site specific travel management plans are developed for high, medium, and low priority geographical areas.

The Willow North Watershed area is within a low priority travel management planning area and there are no specific time requirements for initiating site specific planning for low priority areas. **Therefore, until that travel management planning occurs, all motorized wheeled travel on BLM public lands (excluding WSA's) will be restricted to existing roads and trails within the Malta Field Office boundary**.

This decision applies to the general public's use on BLM land but allows BLM employees, other government entities, and lessees and permittees motorized wheeled cross-country travel when performing administrative functions in managing the BLM public lands. Examples of grazing permittees administrative functions include, but are not limited to: checking vegetative conditions, building or maintaining fences, delivering salt and supplements, moving livestock, checking wells or pipelines as part of the implementation of a grazing permit or lease.

Motorized wheeled cross-country travel to a campsite is permissible within 300 feet of roads and trails. Site selection must be completed by non-motorized means and accessed by the most direct route causing the least damage.

Motorized wheeled cross-country travel for big game retrieval is not allowed.

8. Wilderness Study Areas will continue to be managed under the BLM Interim Management Policy (IMP) and Guidelines for Lands under Wilderness Review until they are acted upon by Congress. The general standard for interim management is that lands under wilderness review must be managed so as not to impair their suitability for preservation as wilderness. This is referred to as the "nonimpairment" standard. This applies to all uses and activities, except those specifically exempted from this standard by FLPMA (such as grandfathered uses, grazing and mining)

Mechanical transport, including all motorized vehicles as well as trail and mountain bikes, is only allowed on existing ways (roads or routes). Mechanical and motorized vehicles may only travel to a campsite within 30 feet of the center line of the existing ways.

Bitter Creek ACEC

The draft Bitter Creek ACEC Plan Amendment / Environmental Assessment was completed in February, 2000. Several protests were received during the designated protest period. The protests were addressed and a final decision designating the Bitter Creek Area as an ACEC was signed August 8, 2003. The boundary includes the three segments of the Bitter Creek WSA. The management prescription in the final resolution of the protests was to manage the ACEC under the IMP if Congress releases Bitter Creek from WSA status. The specific prescriptions are as follows:

No oil and gas or mineral leasing will be allowed

No new roads, mechanical rangeland treatments or above ground rights of ways will be allowed.

Off highway travel will be limited to existing roads and trails. The watchable wildlife tour route will be continued and maintained for 4X4 travel.

Current management of livestock grazing will continue, with any changes based on Rangeland Health Standards and the goal of maintaining a natural grassland system.

Prescribed fire may be used to maintain the grassland. Existing fences and reservoirs will be maintained. New reservoirs or fences will only be considered if necessary to meet health standards, are reclaimed with native species and are designed to minimize visual change. Noxious weed control will continue with the focus on aerial chemical application and biological control methods. The use of insecticides will not be allowed.

The BLM will promote research by universities and other government agencies to further understand the grassland ecosystem and associated species. The BLM will provide interpretive information to aid in the understanding and appreciation of native plants, animals, geology and other features of the ACEC.

Range Improvements

Most of the water developments that were identified in the Willow North Watershed Report have been completed. The last few livestock waters are scheduled for construction in 2005. The Deep Creek riparian fences in allotments #4711 and #4717 were completed in 2000. No electric fencing was done in the Upper Willow Allotment #4718 as riparian monitoring is showing significant improvement in the riparian zone without the fence. Cattle guards were installed on the pipeline road to improve visitor access to Hose fishing reservoir and eliminate the "left open gate" problem.

Wind Farm

A proposal to develop a 500 MegaWatt (MG) wind farm has been made in this watershed. The farm at full development would include over 300 turbines and encompass approximately 20,000 acres with approximately 10,000 acres being federal. The current proposal for the wind farm is a 4 phase project which would not be completed until 2017. An associated 500 kv power line would also pass through this watershed. A land use plan amendment and associated NEPA documentation will be completed if the project proceeds.

Conclusion

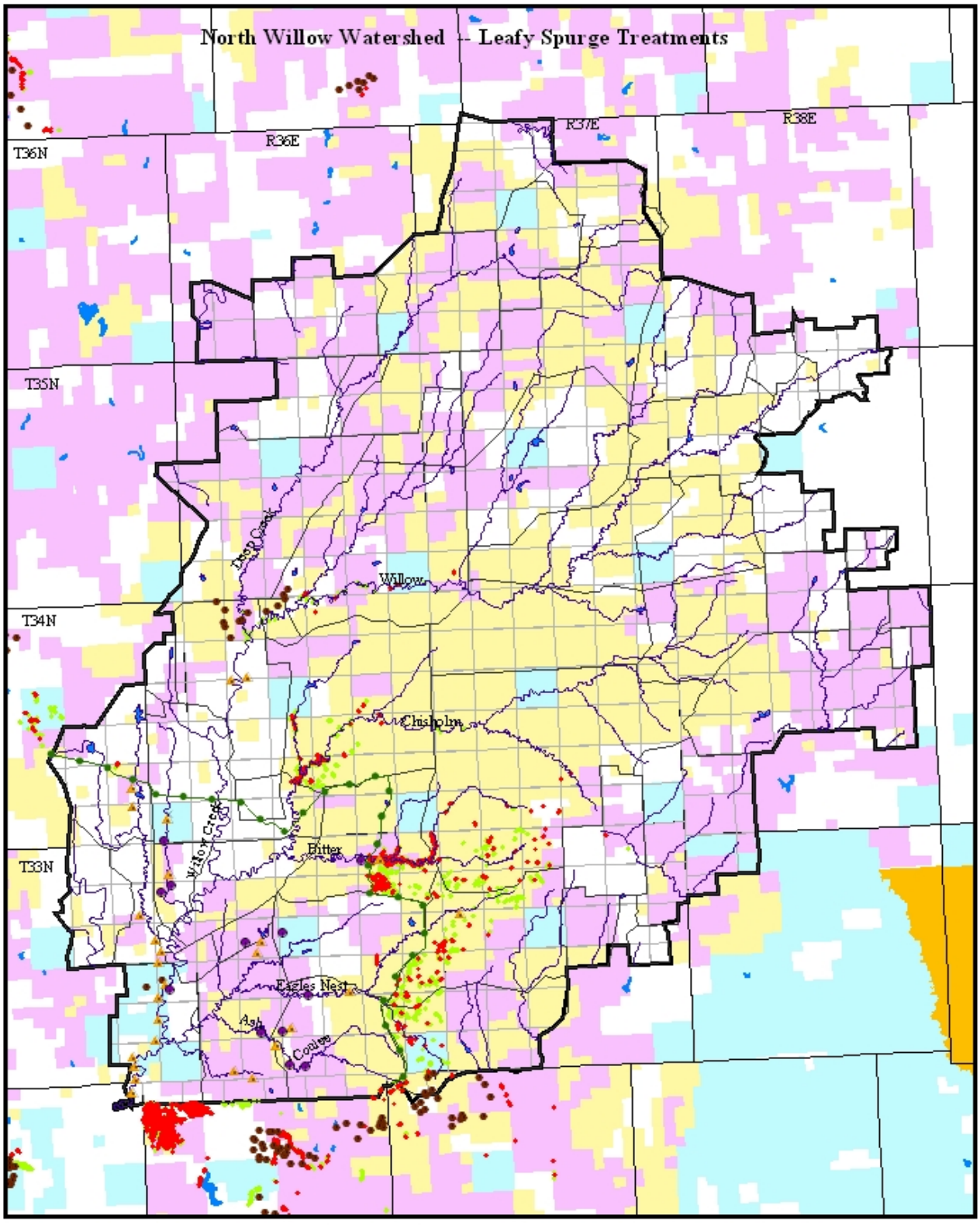
The review of the monitoring data in the Willow North watershed indicated that it is making progress toward meeting all the Rangeland standards. The cooperation of the livestock operators in modifying grazing systems and resting certain areas has helped improve the condition of these public lands. Climatic conditions have generally been favorable the last 5 years which has also helped improve the vegetative conditions in the watershed.

With the given resources, funds and staff we will continue to fight the war on weeds. We are currently using all the management tools to prevent the spread of leafy spurge in the Willow North Watershed

The BLM in cooperation with the permitees will continue to monitor the riparian and uplands to ensure continued upward trends on those areas that have not yet met the standards. The BLM is committed to more intensive monitoring and inventory of Greater Sage-grouse habitat in order to maintain or improve the existing habitat. A signing and map program for OHV and the Bitter Creek WSA will be implemented in the near future if funding is available.

The continuation of the watershed process will take cooperation and partnership with the permittees, interest groups and other federal and State Agency. Consultation, Cooperation and Coordination all for the sake of Conservation is a tradition and work practice that continues to result in successes in our public land management

Map1


North Willow Watershed -- Leafy Spurge Treatments
R36E
R37E
R38E
T36N
T35N
T34N
T33N
Deep Creek
Willow
Chisholm
Willow Creek
Bitter
Eagles Nest
Ash
Coulee
Treatment Type:
2004 Aerial Treatment
2004 Ground Treatment
2002 Aerial Treatment
Established Biological Control Sites
New Biological Control Release Sites (est. 2004)
North Willow Boundary
Current Weed Boundary
Allotment Fence Lines
1:212,368
Scale
Spray graphics are not to scale.